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EMPLOYMENT OPPORTUNITIES IN NEW MEXICO AND WEST TEXAS FOR GRADUATES OF A TWO-YEAR PROGRAM IN APPLIED HORTICULTURE AND AGRICULTURAL MACHINERY.

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IN RESPONSE TO CHANGING OCCUPATIONAL PATTERNS, NEW LEGISLATIVE PROVISIONS, THE INCREASING INTEREST OF URBAN STUDENTS, AND THE ESTABLISHMENT OF A NEW 2-YEAR AGRICULTURAL INSTITUTE, A SURVEY OF HORTICULTURE AND AGRICULTURAL MACHINERY OCCUPATIONS WAS CONDUCTED. THE OBJECTIVES WERE TO (1) DETERMINE EMPLOYMENT OPPORTUNITIES AND TRAINING NEEDS, (2) COMPARE SALARIES, (3) DETERMINE EMPLOYER PREFERENCE FOR EMPLOYEES WITH POSTSECONDARY EDUCATION, AND (4) PROJECT EMPLOYMENT OPPORTUNITIES. OCCUPATIONAL TITLES WERE FORMULATED FROM THE LITERATURE, QUESTIONNAIRES DESIGNED AND TESTED, EMPLOYER LISTS COMPILED, QUESTIONNAIRES MAILED, NONRESPONDENTS CONTACTED, AND DATA ANALYZED. THE FINDINGS WERE BASED ON THE RESPONSES OF 79 HORTICULTURE AND 98 AGRICULTURAL MACHINERY EMPLOYERS. HORTICULTURAL EMPLOYMENT OPPORTUNITIES WERE GREATEST IN RETAIL NURSERIES AND AT GOLF COURSES. SALARIES AVERAGED $86 PER WEEK, AND AN ESTIMATED 95 MORE WORKERS WOULD BE NEEDED WITHIN 5 YEARS. AGRICULTURAL MACHINERY EMPLOYMENT OPPORTUNITIES WERE GREATEST FOR MECHANICS, PARTS CLERKS, AND SALESMEN. SALARIES AVERAGED $100 PER WEEK, AND 448 ADDITIONAL EMPLOYEES WOULD BE NEEDED WITHIN 5 YEARS. MOST HORTICULTURE AND AGRICULTURAL MACHINERY EMPLOYERS WOULD HIRE POSTSECONDARY GRADUATES AT HIGHER SALARIES. (JM)

EMPLOYMENT OPPORTUNITIES

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In New Mexico and West Texas

For Graduates of a Two-Year Program

In APPLIED HORTICULTURE

And AGRICULTURAL MACHINERY

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Agricultural Institute

Department of Agricultural And Extension Education

NEW MEXICO STATE UNIVERSITY
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FOREWORD

This publication was developed in response to needs created by a number of conditions and trends related to post-high school education in agriculture. These items include:

1. Rapidly changing occupational patterns in applied horticulture and agricultural machinery.

2. Provisions in the Vocational Education Act of 1963 for training present and prospective workers for occupations in agriculture other than farming or ranching.

3. Increasing interest in agriculture of students from suburban communities.

4. The establishing of a two-year Agricultural Institute at New Mexico State University.

The material contained in this publication was developed by Richard A. Cobb, graduate assistant in Agricultural and Extension Education, as a Masters Degree Report.

It is hoped that future program planning will be based upon results as reported in this publication.

Leon A. Wagley
Associate Professor and
Head of the Department

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CHAPTER I

INTRODUCTION

There is little room today for the uneducated and untrained to move into any enterprise. Indeed, even their barest survival is threatened. Our society of 180 million people is premised on the doctrine that each has the right to shape his own destiny. But, in this new age--when men's knowledge is doubling every decade--only those who possess marketable skills and knowledge are in control of their own lives. Pockets of chronic unemployment and groups of unemployables are more than local problems. Because of the radical changes in job skills and requirements, the mobility of people today, and the swift changes taking place in business and industry, the vocational training opportunities or lack of them in any one place become matters of national concern.

At the moment, much attention should be focused on the five million unemployed; on the 2.6 million young people who are entering the job market each year; and, on the countless numbers of unskilled and semiskilled workers who will soon find themselves the victims of technological obsolescence.[1]

Because of the present condition of unemployment, society has become preoccupied with providing short intensive training programs

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[1]Walter M. Arnold, "The Team Approach in Vocational Education", A Design for the Future, Report of a National Seminar on Agricultural Education (Columbus: The Ohio State University, 1963), p. 77.

for one or another of the groups of unemployed, and rightly so, according to Smith. But, over and over again such attempts at training have been blocked by the lack of training essentials; there may be no facilities, equipment or materials; no curriculum; no instructional aids; or indeed no teachers. These are products of educational systems and institutions and of years of experience and development, the lack of which cannot be overcome easily or quickly.

The development of an adequate vocational education system, therefore, should be prerequisite to a successful program of training and retraining. How to provide such a system as an integral part of total education and avoid dead-end tracks for those who take vocational training constitutes one of the major educational challenges of the present day.[2]

The Problem

Statement of the problem. The problem was to determine the number and type of employment opportunities in the areas of agricultural mechanics and applied horticulture for students graduating from the two-year Agricultural Institute at New Mexico State University.

Limitations of the problem. The problem was limited to 211 owners of horticultural-related businesses and 150 employers in farm machinery enterprises in New Mexico and West Texas.

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[2]Harold T. Smith, Education and Training for the World of Work (Michigan: W. E. Upjohn Institute, 1963), p. 1.

Objectives of the study.

1. To obtain conclusive evidence as to the number of available employment openings, and the type of training needed in the fields of agricultural mechanics and applied horticulture for two-year graduates of the Agricultural Institute at New Mexico State University.
2. To compare the starting weekly salaries and work hours per week required of specific occupational job titles in agricultural mechanics and applied horticulture.
3. To determine employer preference for hiring graduates of two-year post high school programs rather than hiring high school graduates.
4. To determine if projected job opportunities were sufficient to warrant continuing the Agricultural Institute program.

Definition of Terms

For the purpose of this study, the following terms were used as defined:

Agricultural Mechanics. Those occupations related to the sale, maintenance, and repair of agricultural machinery and implements.

Applied Horticulture. Those activities pertaining to the supervision, propagation and care of plant materials.

Method of Investigation

To accomplish the purpose of the present study, the following procedures were projected:

1. Occupational job titles were formulated from the literature dealing with horticultural and machinery occupations and in consultation with knowledgeable people in agriculture and industry.
2. Questionnaires were developed to gather specific information from horticulture and machinery employers.
3. The inquiry instrument was tested for clarity and completeness on several employers in the Las Cruces, New Mexico area.
4. A listing of the businesses to be sent questionnaires was secured from telephone directories of cities in New Mexico and West Texas.
5. A cover letter explaining the purpose of the study to accompany the mailed questionnaire was formulated.
6. The instruments were mailed.
7. Follow-up questionnaires were sent to employers who failed to respond two weeks after the first mailing.
8. Data were tabulated by the New Mexico State University Computer Center.
9. Data were identified in terms of employment opportunities.
10. The findings were summarized and conclusions were drawn.

Treatment of Data

Data was analyzed in terms of: (1) work hours per week required of employees, (2) starting weekly salary, (3) special training needed, (4) number of years experience desirable for entry into the occupation, (5) number of openings expected within five years, and (6) number of employees now working in the industry.

Presentation of the Study

The present study has been organized into four chapters. The four chapters are presented in the following manner:

Chapter I -- Introduces the problem, gives pertinent background and justifies the need for the study.

Chapter II -- Presents a review of the literature related to the problem. Through a review of the literature, an attempt has been made to show that the study hereby undertaken is essential to contribute new concepts to the knowledge available in this area.

Chapter III -- Reports the substantive findings of the study as to the employment opportunities in the horticulture and machinery industry in New Mexico and West Texas.

Chapter IV -- Presents the summary and conclusions suggested by the findings of the study.

CHAPTER II

REVIEW OF THE LITERATURE

During recent months there has been much concern regarding the availability of technical workers in many segments of our agricultural manpower force. Agricultural leaders from teacher training institutions, state vocational education supervisory staffs, and representatives of national education groups have met many times and at various levels to study different aspects of this topic. Representatives of management and labor have been included in most of the sessions held. Invariably, regardless of the field of agricultural labor studied, the consensus has been the same. There are shortages of qualified workers at the technical level and very little has been done in recent years to alleviate the situation.[3]

A review of the literature by Kahler shows that specific agricultural skills, abilities, and understandings are needed by managers and employees in retail farm machinery distribution in order to carry out efficiently the function of their jobs. Kahler further mentions, "educational programs should be developed at the post high school level to provide training that will update the skills, ability and understandings needed by those presently employed in these

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[3]A Suggested Two-Year Post High School Curriculum and Course Outline, A Report from the Center for Research and Leadership Development in Vocational and Technical Education, Division of Adult and Vocational Research, United States Office of Education (Washington: Government Printing Office, 1965), p. 1.

occupations".[4] He also suggested that evaluations be made of existing educational programs in public schools and in industry to determine what change and/or additions can be made to provide training for initial employment. Programs should provide practical farm experience and formal instruction in agriculture as well as instruction in the technical and business aspects.[5]

The Agricultural Technician

Only recently has recognition been made of the emergence of a technical worker in agriculture located at a point between the highly skilled artisan and the professional. The following definition of an agricultural technician was adopted by a group of over one-hundred supervisory, teacher education, and institutional representative personnel from over fifty states who met in a week-long seminar on July 1, 1964 at the Ohio State University:

> An agricultural technician is a worker located in job classification structure, in his work performance, and in his educational attainment between the skilled worker and the professional. He possesses the skill and ability, working independently or with minimal supervision from a professional to analyze and interpret information, diagnose problems, make decisions, and make practical applications of theoretical knowledge in performing specific tasks in a specialized field in the production, processing, distribution, or marketing of goods and services in agriculture. He must exercise cognitive skills, but, also must be able to supervise

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[4]Alan A. Kahler, "Competencies in Agriculture Needed by Males Employed in Retail Farm Machinery Distribution" (unpublished Master's thesis, Iowa State University, 1964), p. 61.

[5]*Ibid*.

and perform manipulative skills.[6]

Wagley described the agricultural technician as a person who may use any or a combination of applied scientific, engineering, or business skills in the performance of his job in the agricultural field. This also implies a knowledge of agriculture. This employee performs at a level which normally requires a specialized training beyond high school but which is less than required or expected of a four-year graduate degree. Wagley maintained that the agricultural technician operates above the skilled workman and below the professional. In military terms, he might be described as more involved in tactics than strategy. In other words, the technician in agriculture makes practical application of theoretical knowledge in the performance of specific tasks. Wagley offered an example of this level of employment in the veterinary technician who not only needs an understanding of animals, but also needs some understanding and training in laboratory work and chemistry. But since he may work under a qualified veterinarian, he is not required to have the same level of training as the veterinarian.[7]

The makeup of the agricultural manpower force for many years has been thought of as being composed of workers who can be placed on a continuum representing level-of-occupation preparation. At one end

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[6]Proceedings of the National Seminar on Agricultural Education (Columbus: The Ohio State University, 1964), p. 20.

[7]Leon A. Wagley, "Educational Requirements for Off-The-Farm Agricultural Occupations in Yuma County, Arizona" (unpublished Ed.D. dissertation, University of Arizona, 1964), p. 39.

of the continuum the scientists and professional workers have been placed, and at the other end, the unskilled workers (Figure 1).

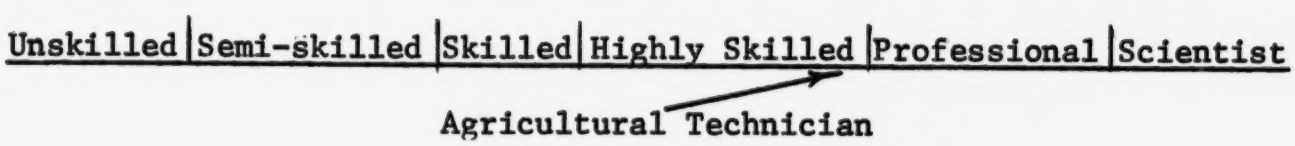

FIGURE I

LOCATION OF AGRICULTURAL TECHNICIAN ON LEVEL-OF-OCCUPATION CONTINUUM

A number of authors have suggested this continuum is indicative of the proportions of manipulative and cognitive skills required of workers. The work of the scientist being predominately cognitive and that of the unskilled worker manipulative.[8]

To further understand the level and place of the technician in terms of educational effort and knowledge, Shoemaker submitted a comparison (Figure 2) relating to the industrial field of engineering.[9] At one level to the right on Figure 2 there is a small group of people called "scientists". These people are trained in graduate programs at the universities.

Engineers support the scientists. These are the people who take the raw ideas from the scientists and develop them into something usable. This is a professional occupation trained at the

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[8] A Suggested Two-Year Post High School Curriculum and Course Outline, op. cit., p. 2.

[9] Byrl R. Shoemaker, "What is a Technician", Preparing Agricultural Technicians, Report of a National Seminar on Agricultural Education (Columbus: The Ohio State University, 1964), p. 29.

baccalaureate level in the university.

Shoemaker mentioned the engineer as being pushed more and more into the theoretical level, with industry requiring more knowledge in the engineering levels. Today, the engineering school does not have time to give the skills of drafting with all the other preparation needed for occupational competence. So a new place has been developed in the field, not substituting for the professional, not substituting for the skilled, but a whole new area of education related to engineering, a group of people now being called technicians.[10]

Shoemaker stated that technicians are supported by skilled craftsmen, tool and die makers, machinists, welders--the class called skill-crafts level in the industrial area. A supporting group for them are the semi-skilled workers, the individual machine operator who is classed as a semi-skilled. The fading group at the other end are the unskilled.

The broken line in Figure 2 is identified by Shoemaker as a representation of the amount of technical knowledge required by these different occupational groups and the area above as the amount of manipulative effort and skill required.[11]

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[10] Ibid., p. 30.

[11] Ibid., p. 31.

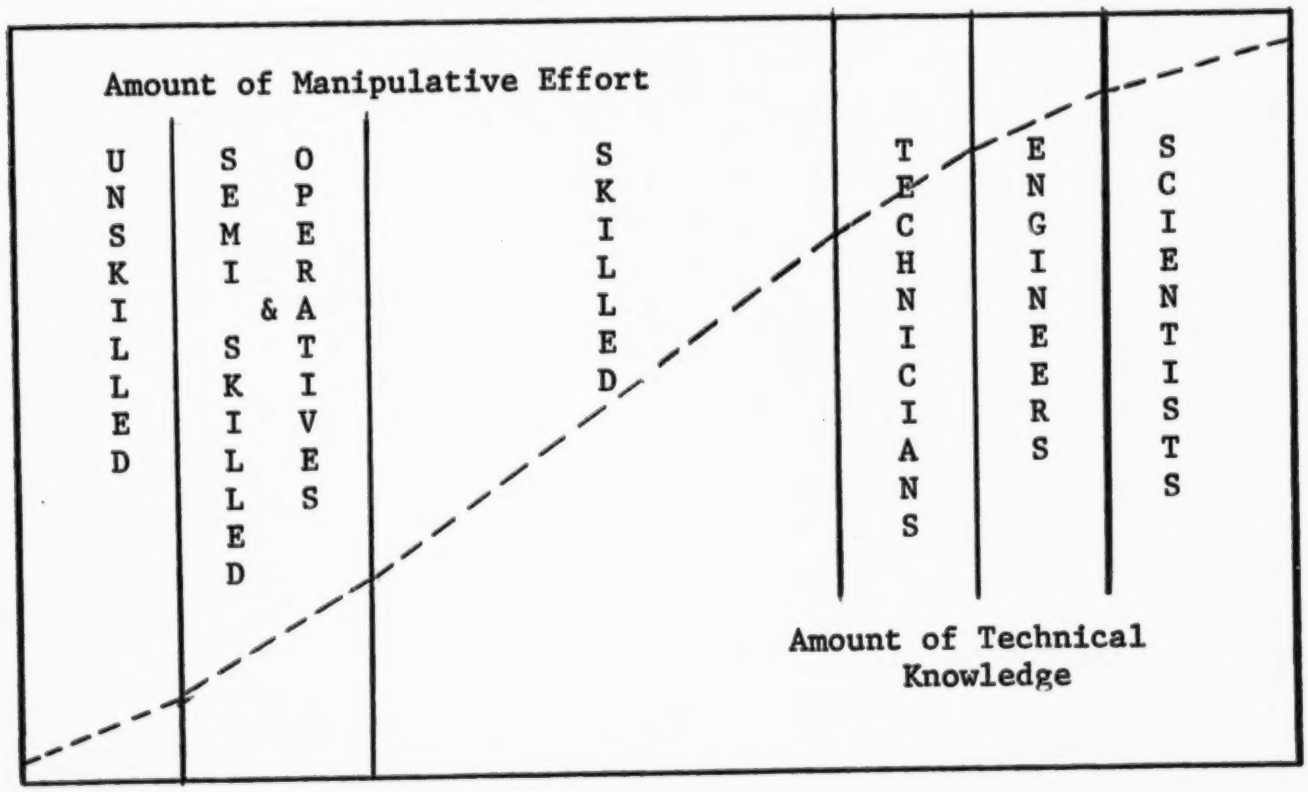

FIGURE 2

RELATIONSHIP OF KNOWLEDGE AND SKILL
IN INDUSTRIAL OCCUPATIONS

Wagley in Table I reported the salaries of agricultural technicians, as observed in an Arizona study.

TABLE I

SALARY STRUCTURE FOR AGRICULTURAL TECHNICIANS,
IN OFF-THE-FARM AGRICULTURAL OCCUPATIONS, BASED ON REPORTS
FROM ONE HUNDRED TWENTY-ONE ESTABLISHMENTS, YUMA COUNTY, ARIZONA, 1964

	Beginning Salary		Top Salary	
Monthly Salary	Number of Companies	%	Number of Companies	%
$250 - $305	-	-	-	-
310 - 369	-	-	-	-
370 - 429	3	18.75	-	-
430 - 489	3	18.75	2	12.50
490 - 549	-	-	3	18.75
550 - 609	-	-	-	-
610 - 669	9	56.25	5	31.25
Over $670	1	6.25	6	37.50

Wagley points out the fact that while over thirty-seven per cent of the agricultural companies in Yuma, Arizona started agricultural technicians at salaries of between $370 and $489, over fifty-six per cent of the companies offered beginning salaries from $610 to $669. Only one business paid a beginning salary to agricultural technicians in excess of $670, while thirty-seven per cent of the firms paid top salaries in excess of this figure.[12]

In an Illinois study, Phipps defined a technician as a semi-professional, highly skilled worker who could be differentiated from both the professional person and the skilled employee. According to Phipps, the technician is located midway between the skilled person and the professional person in the developmental structure of jobs, in his work performance, and in his educational attainment. The jobs of most technicians may be traced to recent application of scientific and technological knowledge in the production and distribution of goods and services. The technician must have the ability to perform many high level skills in his field of work. Phipps suggested that the success of the technician depends on his understanding of scientific principles and his ability to apply these scientific principles in solving problems of modern design production, and service. Thus, Phipps maintained, in any field of work that has both professional level personnel and skilled workers, it is

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[12]Wagley, op. cit., p. 71.

theoretically possible to have technicians.[13]

Inasmuch as the position of the technician lies between the skilled worker in terms of the work they perform and also in terms of the nature of the educational programs by which each is qualified, the newness of the technical worker in agriculture presents some unique attributes and characteristics of technician and of technical education:

1. Technicians are most appropriately channelled into an educational situation which is:
   a. Post high school
   b. Terminal
   c. Occupation centered
   d. Less than baccalaureate degree level
   e. Specific preparation for employment
   f. Two years in length

2. Emphasis in technical education is upon technical and cognitive skill in contrast to manipulative skill.

3. Emphasis is upon skill and ability to make practical applications of theoretical knowledge in performing specific tasks in a specialized field.

4. Emphasis is upon occupational competency.

5. Analysis is made of occupations to determine needs, and job analysis is the basis of curriculum development.

6. Preparation is made for occupational proficiency in families or clusters of jobs.

7. A proper balance of general education, technical education and related educational subjects is maintained.

8. Technicians are characterized and distinguished by

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[13]Lloyd J. Phipps, "Determining Needs for Agricultural Technicians", Preparing Agricultural Technicians, A Report of a National Seminar on Agricultural Education (Columbus: The Ohio State University, 1964), p. 57.

their distinctive abilities, level of occupational competence and specialized training.

9. Technicians usually work in support of or under the supervision of professional personnel and frequently perform tasks that would otherwise be done by professional workers.[14]

Clary further outlined the distinctive characteristics of technician training program objectives:

1. The objective should be such that resulting curricula are primarily occupation-centered and planned toward occupational competence for the graduate.

2. Clearly defined and realistic objectives for the training programs should be developed under the guidance of a professional educator assigned to give leadership in this area.

3. A major objective of the training program should be to prepare the student for immediate production employment in the technician occupation for which training is provided.

4. The objectives should allow for preparation of students for clusters of related technical occupations.[15]

Clary stated that curriculum content for agricultural technician training programs should be closely related to present and future occupational needs:

1. Curriculum content should be primarily occupation-centered.

2. A balance between technical-supporting content and class-laboratory experiences is essential for learning concepts and principles and their application.

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[14] A Suggested Two-Year Post High School Curriculum and Course Outline, op. cit., p. 1.

[15] Joe R. Clary, "Guidelines for the Development of Training Programs for Agricultural Technicians" (unpublished Ph.D. dissertation, The Ohio State University, 1964), p. 79.

3. The difficulty level should be such that it can be mastered by a reasonably high proportion of the students within the time limits of the curriculum.

4. The curriculum should be flexible enough to be easily revised as needed in advance of the changing competencies of the technician.

5. Curriculum content should be planned with advice counsel and support of the agricultural industry for which the training program is being developed. Other agricultural education leaders should also be involved.[16]

The Nursery Industry

According to Brush, the nursery industry is basically agriculture in that it produces and sells living plants. Brush said, "a nursery which is totally wholesale is just as much agriculture and just as much farm as the dairy farm, grain farm, the orchard, or the vegetable farm". "Unfortunately, some people think of the more specialized retail outlets and forget that even there, the plants must be watered, fertilized, and tended just as they are back at the wholesale nursery or the growing grounds where the plants were produced".[17]

Brush pointed out that the nursery community in addition to the wholesalers, the landscape nurserymen, the retail nurserymen, the mail-order nurserymen, and the nursery sales agents which make up the membership of the American Association of Nurserymen, also includes landscape contractors, wholesale florists, growers, arborists, turf

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[16] Ibid., p. 46.

[17] Ray Brush, "Providing Planned Supervised Occupational Experiences for Technical Occupations," A Training Institute for Teachers of Technical Programs in Agriculture (Cobleskill: State University of New York, 1966), p. 32.

producers, landscape architects and landscape designers. Together these make up the specialized area of agriculture which an increasing number of people are beginning to refer to as landscape horticulture.[18]

According to the Horticultural Specialities Census of 1959, the wholesale production of nursery plants more than doubled in the ten year period, 1949 to 1959. It is anticipated by Brush that during the current ten year period, the industry will approximately double again.[19]

To continue this expansion, Brush indicates that the nursery industry needs to improve its efficiency. To do this, technically trained employees must be available. Nursery technicians are needed who not only know several genus and species, but also many varieties of plants and their peculiarities when it comes to using fertilizers, spray materials, as well as rooting hormones, weed control materials, and other very specialized operations. Brush reported that landscape architects and highway departments are looking for well-trained horticultural technicians who can do contract and inspection work. Schools, city parks, industrial firms, highway departments, cemeteries, golf courses, and even the homeowners are demanding more and better tree, shrub, and turf maintenance.

Brush emphasized:

> The curriculum in a horticultural technical program should be altered so that there is provision for work

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[18] Ibid.

[19] Ibid., p. 33.

> experience other than the summer vacation period. This should be during busy nursery seasons when work experience would be most meaningful to the student. To cooperate in occupational experience programs, nurserymen are seeking students who have acceptable work attitudes. When this prerequisite can be met, the nurseryman is most willing to cooperate with the technical program and the student in providing an opportunity for the student to learn the everyday work language of the industry. Nurserymen more than ever are seeking technically trained employees and recognize that they have a responsibility in providing work experience in the training of those employees.[20]

Existing Two Year Programs

Approximately fifty new two-year post high school institutions are being established annually and this trend is expected to continue for several years. Hunsicker maintained that the level of education for those entering agriculture is increasing and soon the completion of two years of post high school education for young people will be almost as common as high school graduation is today.[21]

Wagley alluded to the fact that educational achievement is one of the major critera for employment in off-farm agricultural occupations in Arizona. He further pointed out that high school education, once considered a basic entrance requirement for many positions, is now becoming insufficient. Wagley added "for positions in sales, supervisory, technical, and professional agricultural work, post-high school education becomes more important". In the Arizona study,

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[20] Ibid.

[21] H. N. Hunsicker, "Opportunities Unlimited", A Training Institute for Teachers of Technical Programs in Agriculture (Cobleskill: State University of New York, 1966), p. 76.

junior college training was found to be adequate for seventy per cent of those working at the technical level and for twenty per cent in sales, but college work beyond the junior college is recommended for all positions in professional agriculture.[22]

In order to meet the employment needs of agricultural businesses and farm and trade organizations serving agriculture, technical-occupation institutions must promote, organize and establish agriculture curriculums. Hunsicker predicted accelerated development and growth of new and established agricultural curriculums. Such two-year curriculums will be offered in various kinds of institutions: junior colleges, community colleges, technical institutes, comprehensive schools, area vocational-technical schools, state colleges and four year colleges of agriculture.[23]

Halterman stated, "two-year technical institute-type training is unique in form and content in that it serves a function not commensurate with either professional education or vocational training".[24] Students who benefit most from technical institute-type training are:

1. Those who are intensely interested in a specific technological field.

2. Those who want a technological education, but who for some

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[22]Wagley, op. cit., p. 72.

[23]Hunsicker, op. cit., p. 77.

[24]Jerry J. Halterman, "Determination of Educational Needs of Agricultural Engineering Technicians in Ohio" (unpublished Ph.D. dissertation, The Ohio State University, 1964), p. 18.

reason or another do not undertake a four or five-year baccalaureate degree program.[25]

Halterman further emphasized that technical education students are, for the most part, capable individuals, many of whom are not interested in formal academic study toward the baccalaureate degree program. For these students, the technical institute is not an alternative educational program, rather, it represents the best course of study, serving a need not met by any other instructional program.[26]

Hamlin observed that there are many specialized abilities needed in our complex, technological society for which no institution is now providing adequate training. Once a post high school institution has been established, possibilities develop, not merely for industrial education, but for agricultural occupations, distributive and office occupations.[27]

The primary motive and forces behind the establishment of these new post high school institutions in the South has been to use them to promote economic growth, pictured as primarily industrial growth through the attraction of new industries, which are increasingly demanding arrangements for vocational-technical education of their employees and prospective employees.[28] Hamlin emphasized the decline

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[25] Ibid., p. 19.

[26] Ibid.

[27] H. M. Hamlin, "Improving Post-High-School Education in Agriculture", A Design for the Future, Report of a National Seminar on Agricultural Education (Columbus: The Ohio State University, 1963), p. 205.

[28] Ibid.

of manufacturing in the United States. In thirteen southern states, for example, Hamlin designated that only 21.3 per cent of those working are employed in manufacturing; 78.7 per cent are in other occupations.[29]

A second and urgent reason for establishing these schools has been the desire to provide, economically and appropriately, for greatly increasing number of high school graduates who want further training. Hamlin stressed, "it would take a vast amount of public money to care for these people in the four-year colleges".[30]

Discussing existing two-year programs, Hamlin indicated that Georgia has two long established, well regarded state vocational schools. The state has developed a system of 27 area vocational-technical institutions. In 1963, Georgia provided about two million dollars annually for buildings and $1 3/4 million for operation expenses in the area schools.[31]

South Carolina has a dual system of vocational education. The new system of technical institutes is under the State Commission for Technical Education. Nine technical institutes were in operation by fall of 1964, only one operated during 1962-63. The entire system will include twelve institutes. The state puts up about $1 million a year for these schools.[32]

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[29] Ibid., p. 206.

[30] Ibid.

[31] Ibid., p. 207.

[32] Ibid.

North Carolina is completing its system of twenty industrial education centers, seventeen of them were in operation in 1962-63, and combined them with three public junior colleges under a new charter for higher education adopted by the 1963 General Assembly.[33] Seven of these centers had programs in agricultural technology in 1962-63 and twelve had these programs in 1963-64. The program was financed with $3.5 million in additional funds voted by the 1963 General Assembly, which brought the total biennial appropriation to $7 million.[34]

Virginia has nine state-aided vocational schools.[35]

Tennessee's 1963 legislature provided $5 million for a system of schools which included three regional technical institutes and twenty area vocational schools.[36]

Arkansas initiated its state system of vocational-technical schools in 1957; a system of nine more schools is contemplated.[37]

Kentucky had ten state-operated vocational schools. During the 1964 biennium $4 million of state and federal funds were spent for construction of vocational schools.[38]

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[33] Ibid.

[34] Ibid.

[35] Ibid.

[36] Ibid.

[37] Ibid.

[38] Ibid.

Studies in Other States

Brinkley in a study of pilot two-year programs, found that in many states, there are two to three times as many jobs in non-farm agricultural occupations as there are in farming, and the number is increasing. In New York 3,841 of the workers were found in only sixteen school districts; in Utah 5,774 in two counties; there were 4,692 workers in eleven Mississippi counties; and 14,905 in seventeen Pennsylvania counties. In 1959, Kentucky had 150,000 farmers. There were approximately 128,000 people working in businesses that serviced and sold supplies to farmers, businesses that processed agricultural products, and firms that wholesaled farm products--almost a one-to-one ratio. Add this to the people in ornamental horticulture and the ratio exceeded one-to-one.[39]

In a survey conducted by Bingham focusing on agricultural occupation needs in Kentucky for the areas of farm machinery, farm supply, agricultural chemical, nursery and livestock marketing, it was found that farm machinery mechanic was one of the most significant occupations on the basis of frequency of occurence, job openings, and number of people employed.[40]

Bingham further reported that the jobs in nursery and related-

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[39]Harold Brinkley, Pilot Programs in Agricultural Occupations, Bulletin of the Division of Vocational Education, College of Education (Lexington: University of Kentucky, 1967), p. 7.

[40]W. Bingham, "Agricultural Occupations Other than Farming in Selected Kentucky Counties, With Implications for Vocational Education" (unpublished Ph.D. dissertation, University of Kentucky, 1964), p. 89.

type businesses required managers, landscape designers, and foremen, at the higher level, and greenhouse, nursery and landscape crews at the lower level.[41] Bingham also noted that dependability was rated more important than personal appearance, politeness, desire to learn, and personal character.

A North Carolina study encompassing a nine county area was administered to high school graduates and drop-outs of classes in vocational agriculture in 1960 to determine the nature and extent of the need for providing training in agricultural technology for workers already employed in off-farm agricultural occupations and to determine the nature and extent of the need for providing training in agricultural technology for individuals who wish to prepare for entry into off-farm agricultural occupations.[42] In this research, Blackman and Dawson found that many agricultural industry and business firms have individuals employed who need additional training. Many of the firms do not have an organized training program and it was made evident by Blackman and Dawson that technical training should be provided for individuals who desire employment in agricultural industry and business firms. Relative to other types of employees, the need for training of the skilled plant workers is by far the greatest need in North Carolina.[43]

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[41] Ibid.

[42] J. H. Blackman and C. G. Dawson, Need for Training for Non-Farming Agricultural Occupations, A Report by the Vocational Division, North Carolina Department of Public Instruction (Raleigh: North Carolina Department of Public Instruction, 1961), p. 13.

[43] Ibid., p. 20.

Throughout this study, it was noted that a large per cent of the high school senior boys in 1961 did not plan to attend college, and need and desire an opportunity to take additional training of less than college grade. This also seemed to be true with vocational agriculture graduates and dropouts of 1959 and 1960.[44]

Kahler, in an Iowa study, determined the agricultural competencies needed by males employed in retail farm machinery distribution and determined the employment opportunities for these potential employees.[45] Fifteen carefully selected farm machinery dealers in Iowa served as a panel of specialists in developing a list of agricultural and nonagricultural competencies needed by male employees and evaluated the degree each competency was needed in order to carry out efficiently the functions of their jobs and the degree each competency was possessed.

Kahler's survey found that employees need an understanding of economic reasons for use of labor saving machines, type of machinery used in local farming areas, machinery financing procedures, farm machinery valuation; also, the abilities to manage trade-in inventory, adapt machinery size to farm operation, estimate trade-in values of used machinery, locate failures and make repairs.[46]

A Utah study of managers of businesses employing workers who

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[44]Ibid., p. 23.

[45]Alan A. Kahler, "Competencies in Agriculture Needed by Males Employed in Retail Farm Machinery Distribution" (unpublished Master's thesis, Iowa State University, 1964), p. 62.

[46]Ibid., p. 78.

need agricultural competencies was conducted by Schank to identify present and emerging agricultural occupations for which vocational and technical agricultural education should be available; and, to determine present and anticipated numbers of employees, annual entry opportunities, and competencies needed for entry into the occupations.[47]

Shank surveyed the total work force for two counties in Utah to be 158,819. Approximately 5,729 or 36 per cent of these workers were employed in occupations related to farming. Shank also found that the greatest demands for workers were in the areas of animal science, agricultural mechanics and nursery work, and that employers in these occupations were looking for trained employees. The agricultural mechanics area needed experienced men in sales and service. Knowledge of farm equipment was essential to agricultural mechanics salesmen. Shank's study pointed out the great demands for trained workers in almost all fields of off-farm agriculture. He mentioned, "training should be provided for persons on both the high school and post-high school levels".[48]

Sutherland and Thompson conducted an investigation in California to define the number and kinds of positions in agricultural businesses that seem to require agricultural training; and, to determine the training requirements, both agricultural and business,

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[47]D. R. Shank, A Study of Off-Farm Agricultural Occupations of Utah's Salt Lake and South Davis Counties to Determine Educational Needs, A Report from the Department of Agricultural Education (Logan: Utah State University, 1964), p. 34.

[48]Ibid., p. 46.

for workers in these positions.[49]

The research reported that over 1,400 new agriculturally trained employees will be needed in the near future to fill anticipated new positions in the companies. The most common types of businesses employing agriculturally trained persons were those engaged in sales and service of agricultural products and farm supplies. About 20 per cent of the 24,305 persons employed by the companies needed agricultural training. About one-half again as much work activity is engaged in by technicians in the field of agriculture services as in any other general field.[50]

In Iowa, fifteen outstanding employers of selected off-farm agricultural occupation areas served as a panel of specialists to develop lists of the agricultural competencies needed by males employed in these businesses. Each list of agricultural competencies, as prepared by the panel of specialists was submitted by Bundy and Blake to the top ten per cent of the businesses in each of the selected areas. The employers typical of those in the industry being studied were asked to indicate the present and future manpower needs of their businesses. Bundy and Blake mentioned, "employer evaluations of employees and employee self-evaluations revealed a greater degree of competency was needed in agriculture than

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[49]S. S. Sutherland and O. E. Thompson, The Training Required by Workers in Agricultural Business and Industry in California (Sacramento: California State Department of Education, 1957), p. 21.

[50]Ibid., p. 23.

employees possessed.[51] It was also emphasized that the smaller the business, the more competent employees needed to be in a greater number of knowledges and skills. "As size of the business increased", they further noted, "the degree of competency needed and possessed increased in the competencies characteristic of a level of employment".[52]

In an analysis of farming in Arizona and similiar states, Wagley observed that the investment in farm machinery and equipment comprise more than one-half of the total investment in personal property. A further analysis shows that the rate of depreciation for farm machinery and equipment is much higher than for all other personal property, and that the cost of maintenance is much higher than for real estate and other capital investments on the farm.[53] Wagley acknowledged, "farmers are constantly thinking of ways to reduce labor and costs, and many times in analyzing the costs of production, find that machinery is the major part of the entire cost".[54]

Data on the number of employees needing competencies in agri-

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[51]C. E. Bundy and D. L. Blake, Competencies in Agriculture Needed by Males Employed in Off-Farm Agricultural Occupations, Cooperative Study--Department of Education, and Iowa Agriculture and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, and the Vocational Agriculture Section, State Department of Public Instruction, Des Moines, 1965, p. 30.

[52]Ibid.

[53]Wagley, op. cit., p. 93.

[54]Ibid.

cultural mechanization in Arizona as reported by Wagley are shown in Table II.[55]

TABLE II

NUMBER OF EMPLOYEES WHOM EMPLOYERS SAY NEED COMPETENCIES IN AGRICULTURAL MECHANIZATION BASED ON REPLIES OF ONE HUNDRED TWENTY-ONE ESTABLISHMENTS IN YUMA COUNTY, ARIZONA, 1964

Competency	Useful for Entry	Needed on Job	Factor in advancement
Operate and adjust farm machinery .	126	249	278
Preventive maintenance of machinery	64	166	216
Ability to repair farm machinery. .	86	167	201
Agricultural construction	48	69	71
Maintain electric equipment	15	32	53
Arc and Acetylene welding	59	96	103

In his survey of Arizona employers, Wagley described the job of the mechanic:

> ...performs a skilled type of work. In addition to being a good general mechanic, he must be a specialist in a particular kind of machinery. He must be able to perform or supervise the work of repairing and overhauling engines, power transmissions, and electrical equipment. In addition to this, he must know how to adjust and repair large farm machines such as balers, mechanical cotton harvesters, and forage cutters. In some of the larger shops, it was found that a mechanic or technician may specialize in only one or two of these areas.[56]

From employers interviewed in Kansas by Agan, it was estimated that 6,787 persons had been employed during the past five years in agriculturally oriented occupations. It was also estimated that

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[55] Ibid., p. 94.

[56] Ibid., pp. 95-96.

2,823 additional employees would be needed in the State of Kansas in the next five years due solely to the growth in agricultural off-farm business. This figure is in addition to those needed for normal turnover of employees. Employers were asked during the Kansas study to identify those areas, strictly agricultural, with which employees in the various jobs should be familiar. The following are the most frequently selected subject matter areas in order of importance given them by the employers as reported by Agan:[57]

1. General agricultural knowledge.
2. Salesmanship.
3. Tractor, power units, and mechanics.
4. Soils and crops.
5. Agricultural chemicals, insect and pest control.

Stevens has shown in a twenty-five state comprehensive survey of off-farm agricultural occupations that instructors devise course changes and prepare teaching plans and outlines based on anticipated trends in employment and the kinds and amounts of education and training required for entry and for advancement. Stevens commented, "there is a readiness, often an eagerness, of several hundred employers in businesses and services other than farming to become involved in new programs of occupational education". Stevens further remarked that an amazing clarity of differentiation of employee functions, and of competencies required, was evidenced by the employers

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[57]R. J. Agan, A Study of Non-Farm Agricultural Occupations in Kansas, A Cooperative Study--Kansas State Board for Vocational Education and the School of Education, Kansas State University, Manhattan, 1963.

interviewed.[58]

Barwick estimated the present total employment in the state of Delaware for off-farm agricultural businesses to be 2,053. The number of present employees needing agricultural competencies in farm machinery was 262, in ornamental horticulture 2,663. Barwick pointed out that in the next five years, 82 employees will be needed in farm machinery occupations, and 385 employees will be needed in Delaware ornamental horticultural enterprises.[59]

A study made in Alabama to ascertain the nature and extent of off-farm agricultural employment opportunities shows that of 4,204 persons employed in an agricultural occupation, 622 employees are needed for current employment in farm machinery sales and services; 96 more will be needed in five years, a 15 per cent increase. The survey further reported that 754 employees are needed for current employment in ornamental horticulture; 108 more will be needed in five years, a 21 per cent increase.[60]

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[58]Glenn Z. Stevens, "Promising Research Directions in Off-Farm Agricultural Occupations", Program Development and Research, Report of a National Seminar on Agricultural Education (Columbus: The Ohio State University, 1965), pp. 97-99.

[59]R. P. Barwick, Identification of Off-Farm Agricultural Occupations, Agricultural Education Publication Number 3 (Newark: The University of Delaware, 1965), p. 13.

[60]R. A. Baker, A Study of Employment Opportunities in Off-Farm Agricultural Occupations in Alabama, A Joint Study by the Agricultural Education Service, Alabama State Department of Education, Montogomery, and the Department of Vocational, Technical and Practical Art Education, School of Education, Auburn University, Auburn, 1965, pp. 34-36.

Foster anticipated an increase of 13 per cent in workers needing agricultural competencies during the next five years in Colorado; the largest increase was expected in ornamental horticulture. Foster emphasized, "the education level for initial employment desired of prospective employees was high school plus special training".[61]

Foster designated 1,555 employees now being employed need agricultural competencies in farm machinery sales and services; 1,350 will be needed in five years, a 16.9 per cent increase. Also, 2,510 employees now employed needed agricultural competencies in ornamental horticulture; 3,803 will be needed in five years, a 51.1 per cent increase.[62]

Freier reported 720 workers with agricultural competencies presently engaged in farm machinery businesses in Minnesota; 372 more being needed in five years. Minnesota also had 31 employees currently working in ornamental horticulture, with 12 more employees needed in five years.[63]

A Michigan survey conducted by Langdon reported 238 workers now employed in farm machinery sales and services; 314 needed in five years, a 32 per cent increase. Langdon cited 1,058 workers employed

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[61]Paul J. Foster, A Study of Agricultural Occupations Other Than Farming and Ranching in Colorado, A Preliminary Report (Denver: State Board for Vocational Education, 1965), p. 15.

[62]Ibid., pp. 12-14.

[63]E. E. Freier, The Minnesota Agricultural Off-Farm Occupational Opportunities and Training Needs, A Report by the Mankato Area Vocational-Technical School, Mankato, Minnesota, 1965, pp. 19-23.

in ornamental horticulture; 1,470 more will be needed in five years, a 38 per cent increase.[64]

Mondart and Curtis, in a Louisana study, noted 1,056 employees now working in farm machinery sales and service, with 500 more needed in five years; and, 872 employees presently employed in ornamental horticulture, 845 being needed in five years.[65]

Bailey specified 1,773 employees engaged in farm machinery enterprises in West Virginia, 34 more needed in five years. Bailey further indicated 1,344 employees working in West Virginia ornamental horticulture occupations, with 125 more needed in five years.[66]

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[64]C. L. Langdon, A Survey of Agricultural Occupations in Michigan, A Report by the Vocational Agriculture Service (Lansing: Michigan Department of Public Instruction, 1965), pp. 4-5.

[65]C. L. Mondart and C. M. Curtis, Occupational Opportunities and Training Needs for Nonfarm Agricultural Jobs in the Metropolitan Areas of Louisana (Baton Rouge: Louisana State University, 1965), p. 11.

[66]J. K. Bailey, Non-Farm Agricultural Employment in West Virginia with Implications for Vocational Education Programs, A Report from the Division of Vocational, Technical, and Adult Education (Charleston: University of West Virginia, 1965), pp. 16-19.

CHAPTER III

PRESENTATION OF DATA

The present chapter is concerned with a survey of employers in New Mexico and West Texas engaged in Machinery and Horticulture off-farm agricultural occupations; and, with an analysis of the job titles, hours of work per week required, weekly starting salary, number of openings expected, and amount of training preferred by employers for workers in these positions. The data reported was based upon responses by 79 horticultural or related employers and 98 owners of farm machinery enterprises.

Horticulture

Questionnaires mailed to horticultural employers listed 29 different occupational job titles relating to the horticultural or nursery business. While many of the firms were highly specialized as to the type of training required, some were found to need persons with knowledge of three or more functions of similiar importance. For instance, a person employed as a florist manager also might function as a propagator, salesman or florist designer.

Table III indicates the responses of employers in horticultural businesses in terms of jobs needed within the enterprise.

TABLE III

EMPLOYER RESPONSES FOR NEEDED HORTICULTURAL OCCUPATIONS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Needed Occupation	Number of employers responding
Florist Designer	13
Nursery Retail Salesman	11
Golfcourse Greenskeeper	11
Landscape Gardener	7
Nursery Retail Manager	6
Golfcourse Section Foreman	4
Greenhouse Grower	4
Nursery Wholesale Budder & Grafter	3
City Park Machinery Operator	2
Nursery Wholesale Propagator	2
Nursery Wholesale Order Filler	2
Speciality Grower	2
City Park Foreman	1
City Park Grower Apprentice	1
Nursery Wholesale Salesman	1
Golfcourse Pest Control Foreman	1
Land Contracting Foreman	1
Arborculture Dendrician	1
Ornamental Plant Broker	1

The greatest number of horticultural businesses in New Mexico and West Texas pertain to retail nursery activities and golfcourse maintenance and operation. Fewer jobs are available through state or city park systems or through wholesale nursery industries.

It was noted in the study that 35 respondents not reported in Table III operated family-owned and operated small nursery units not requiring additional employees beyond family members.

Florist designer. The largest number of respondents, both in large specialized enterprises and in businesses with fewer employees,

indicated that competency and skill in florist design work was important.

Table IV illustrates the hours per week required of a florist designer and the weekly starting salary for persons engaged in design activities.

TABLE IV

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF FLORIST DESIGNERS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40	$56	1
	90	1
40	$50	1
	60	1
	65	1
	68	1
	80	2
	95	1
More than 40	$87	1
	100	3

The average starting weekly salary for florist designers working less than forty hours was $71 per week; for forty hours--$71 per week; and, for more than forty hours--$90 per week.

All respondents indicated that special training was needed and that experience was helpful for persons intending to pursue florist design work.

Employers anticipated ten openings within the next five years

for florist design employees, and there were a total of sixteen employees now engaged in that capacity.

Nursery retail salesman. A nursery retail salesman secures wholesale ornamental plants and supplies and moves them into selling areas. He also arranges plant material for displays, and contacts prospective buyers. From eleven employers who foresaw a need for nursery retail salesmen, Table V shows weekly starting salary and hours of work per week expected of persons working in that dimension.

TABLE V

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF NURSERY RETAIL SALESMEN BASED ON REPLIES FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$50	1
	55	2
	60	1
	100	1
More than 40	$80	3
	85	1
	90	1
	125	1

In estimating weekly starting salary, no consideration was given to the fact that most employers offer a commission on sales in addition to the salary.

Respondents indicated a salary for nursery retail salesmen ranging from $50 to $125 and averaging $78 per week. Nine employers

mentioned special training in horticulture as being essential to a nursery retail salesman. Responses showed that horticultural employers will need eleven nursery retail salesmen in New Mexico and West Texas within the next five years. Sixteen workers are currently employed in this job classification.

Golfcourse greenskeeper. Eleven golfcourse personnel cooperating in the survey pointed out that a greenskeeper needed to work more than forty hours per week. Salaries for this position ranged from $40 to $150 per week with an average of $93 for all responses. Eight of the golfcourse employers indicated special training and at least two years additional experience was necessary for greens work.

Respondents specified that twenty golfcourse greenskeepers would be needed within five years. At this time, respondents employ seventeen greenskeepers in New Mexico and West Texas.

Landscape gardener. The survey shows that seven horticultural businesses replying need and now employ landscape gardeners. Table VI exemplifies the relationships between hours of work required per week and starting salary for landscape gardeners.

TABLE VI

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF LANDSCAPE GARDENERS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40	$40	1
40	$60	2
More than 40	$70	2
	75	1
	80	1

Landscape gardeners' weekly starting salary for all responses ranged from $40 to $80 and averaged $65 in the survey. All horticultural employers mentioned that special training was necessary and up to four years experience desirable for persons seeking a landscape gardener position.

Questionnaires revealed that thirteen landscape gardeners are now employed in New Mexico and West Texas by the respondents. Responses further indicated that twenty-one additional landscape gardeners will be needed within five years.

Nursery retail manager. Starting salary and work hours per week for nursery retail managers is reported in Table VII.

TABLE VII

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF NURSERY RETAIL MANAGERS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$70	1
	80	1
	125	1
More than 40	$80	1
	95	1
	100	1
	200	1

Salaries ranged from $70 to $200, and averaged $107 per week for nursery retail managers based on seven responses from employers. Due to the fact that this occupation emphasizes the management aspect, wide salary ranges may depend on whether or not the business is self-owned and managed, or whether the manager is hired by a non-participating owner. The former situation may account for the larger salaries in Table VII.

All of the respondents indicated that special training and at least five years experience is necessary for a nursery retail management position. Respondents mentioned that six more managers will be needed within five years, and that seven persons are presently employed in this category.

Florist manager. In Table VIII, the work hours per week and starting weekly salary for florist managers is reported.

TABLE VIII

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF FLORIST MANAGERS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	1
	100	1
More than 40	$100	1
	115	2
	125	1

Salaries ranged from $80 to $125 and averaged $100 for all responses regarding florist managers. The six employers responding agreed that special training was required and from one to six years experience was needed for entry into a florist manager position.

There are currently six florist managers employed as pointed out by the six respondents. Four additional personnel will be needed in the next five years for this capacity in New Mexico and West Texas.

Table IX compares the weekly starting salary and work hours per week required of persons employed as golfcourse section foremen, greenhouse growers, nursery wholesale budders and grafters, city park machinery operators, nursery wholesale propagators and order fillers,

city park foremen, city park grower apprentices, nursery wholesale salesmen, golfcourse pest control foremen, land contracting foremen, arborculture dendricians, and ornamental plant brokers.

TABLE IX

COMPARISON OF STARTING WEEKLY SALARY AND HOURS PER WEEK REQUIRED FOR PERSONS EMPLOYED IN VARIOUS HORTICULTURAL OCCUPATIONS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Occupation	Hours per week required	Salary per week	Number of responses
GOLFCOURSE SECTION FOREMAN	40	$80	1
	More than 40	$95	1
		120	1
		125	1
GREENHOUSE GROWER	40	$50	1
		54	1
		65	1
		80	1
NURSERY WHOLESALE BUDDER & GRAFTER	Less than 40	$90	1
	More than 40	$80	1
CITY PARK MACHINERY OPERATOR	40	$60	1
		85	1
NURSERY WHOLESALE PROPAGATOR	More than 40	$90	1
NURSERY WHOLESALE ORDER FILLER	40	$60	1
	More than 40	$75	1

TABLE IX (continued)

Occupation	Hours per week required	Salary per week	Number of responses
SPECIALITY GROWER	40	$90	1
	More than 40	$100	1
CITY PARK FOREMAN	40	$94	1
CITY PARK GROWER APPRENTICE	40	$80	1
NURSERY WHOLESALE SALESMAN	More than 40	$100	1
GOLFCOURSE PEST CONTROL FOREMAN	More than 40	$120	1
LAND CONTRACTING FOREMAN	More than 40	$70	1
ARBORCULTURE DENDRICIAN	40	$85	1
ORNAMENTAL PLANT BROKER	Less than 40	$85	1

Responses from the employers indicated that forty-one employees are now working in the fourteen horticultural enterprises listed in Table IX. Data showed that twenty-four jobs will be available in fourteen various horticultural businesses in New Mexico and West Texas within the next five years.

Replies of all respondents regarding the number of anticipated employees needed in the next five years and the number of workers now employed in horticultural enterprises are reported in Table X. The average starting weekly salary for workers in specific occupations is also included in Table X.

TABLE X

A COMPARISON OF ANTICIPATED NUMBER OF EMPLOYEES NEEDED WITHIN FIVE YEARS, THE NUMBER OF WORKERS PRESENTLY EMPLOYED, AND THE AVERAGE STARTING WEEKLY SALARY FOR HORTICULTURAL OCCUPATIONS BASED ON REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Horticultural occupation	New workers needed within five years	Employees now working	Average salary
Landscape gardener	21	13	$65
Golfcourse greenskeeper	20	17	93
Nursery retail salesman	11	16	78
Florist designer	10	16	75
Nursery retail manager	6	7	107
Florist manager	4	6	100
Nursery wholesale propagator	4	2	90
City park machinery operator	3	7	72
City park grower apprentice	3	10	80
Speciality grower	2	3	90
Nursery wholesale budder & grafter	2	3	85
Greenhouse grower	2	4	62

TABLE X (continued)

Horticultural occupation	New workers needed within five years	Employees now working	Average salary
Golfcourse section foreman	1	4	$105
Nursery wholesale salesman	1	1	85
Golfcourse pest control foreman	1	0	120
Land contracting foreman	1	0	70
Arborculture dendrician	1	1	85
Ornamental plant broker	1	1	85
City park foreman	1	1	94

In reporting salaries for horticultural enterprises, no consideration was given to the fact that a commission is often paid for many of the job titles mentioned in Table X.

Data in Table XI reports the replies of seventy-nine employers regarding whether they would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate for the same job. Responses are based on nineteen occupational titles in horticulture fields.

TABLE XI

EMPLOYER PREFERENCE FOR HIRING A GRADUATE OF A TWO-YEAR PROGRAM AT A HIGHER SALARY THAN A HIGH SCHOOL GRADUATE, BASED ON THE REPORTS FROM SEVENTY-NINE ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Horticultural occupation	Respondents preference for hiring graduates of a two-year program at a higher salary than they would hire a high school graduate	
	Would	Would not
Florist designer	10	3
Nursery retail salesman	10	1
Golfcourse greenskeeper	10	1
Landscape gardener	6	1
Nursery retail manager	7	0
Golfcourse section foreman	4	0
Greenhouse grower	3	1
Nursery wholesale budder & grafter	3	0
Nursery wholesale propagator	2	0
Speciality grower	2	0
City park machinery operator	1	1
Nursery wholesale order filler	1	1
City park foreman	1	0
City park grower apprentice	1	0
Nursery wholesale salesman	1	0

TABLE XI (continued)

Horticultural occupation	Respondents preference for hiring graduates of a two-year program at a higher salary than they would hire a high school graduate	
	Would	Would not
Golfcourse pest control foreman	1	0
Land contracting foreman	1	0
Arborculture dendrician	1	0
Ornamental plant broker	1	0

Data from 147 potential horticulture employment positions in Table XI indicated that employers would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate in 138 cases or for 93 per cent of the positions available; whereas, for 7 per cent of the potential employment openings, employers would show no preference.

Horticultural employers anticipated no need for the following occupations in New Mexico and West Texas within the next five years:

a. State park foreman
b. City park landscape foreman
c. City park greenhouse foreman
d. Nursery wholesale manager
e. Nursery wholesale section foreman
f. Nursery wholesale transportation foreman
g. Land contracting estimator
h. Seed grower
i. Sod cutter and sod layer

Agricultural Mechanics

Questionnaires mailed to machinery dealers listed fourteen occupational job titles relating to machinery sales and/or service. While many of the firms were highly specialized as to the type of training required for entry into the field, many were found to need employees with competencies in three or more functions of similar importance. For example, employers mentioned that it was desirable for a tractor mechanic to have additional skill in diesel maintenance and in welding procedures.

Table XII indicates the responses of employers in machinery businesses in terms of jobs needed within the enterprise.

TABLE XII

EMPLOYER RESPONSES FOR MACHINERY OCCUPATIONS NEEDED WITHIN FIVE YEARS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Needed Occupation	Number of employers responding
Tractor and Machine Mechanic	83
Machinery Parts Clerk	53
Machinery Equipment Salesman	51
Machinery Service Center Foreman	36
Mechanic's Helper	30
Diesel Mechanic	29
Assemblyman	27
Machinery Parts Salesman	26
Machinery Fieldman	10
Arc Welder	5
Tire Service Repairman	4
Small Gas Engine Mechanic	2
Acetylene Welder	2

The largest number of machinery businesses in New Mexico and West Texas need persons for mechanic-type occupations and for

machinery parts activities. Fewer employees are needed to serve as welders, tire repairmen, and small gas engine mechanics.

Tractor and machine mechanic. The greatest number of responses, both from large specialized machinery businesses and from enterprises with fewer employees, stated that workers with competency and skill in tractor and machine mechanic work were most often needed in machinery businesses.

Table XIII illustrates the hours per week required of a tractor and machine mechanic and the weekly starting salary for persons engaged in this activity.

TABLE XIII

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF TRACTOR AND MACHINE MECHANICS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$75	1
	85	1
	90	2
	100	9
	125	2
More than 40	$80	2
	85	4
	87	2
	90	5
	92	1
	95	3
	100	29
	105	2
	110	2

TABLE XIII (continued)

Number of work hours required per week	Salary per week	Number of responses
More than 40	120	4
	125	7
	130	1
	135	1
	140	1

The average starting weekly salary for tractor and machine mechanics working forty hours was $99 per week; more than forty hours $102 per week. Salaries ranged from $75 to $140 to all responses and averaged $101 per week for tractor and machine mechanics.

Eighty-one of the respondents indicated that special training was needed and that up to ten years experience for higher paying positions was preferred for entry into tractor and machine mechanic occupations.

Employers anticipated 166 openings within the next five years in New Mexico and West Texas and had a total of 238 workers now engaged in a tractor and machine mechanic capacity.

Machinery parts clerk. From fifty-three employers who foresaw a need for machinery parts clerks, Table XIV shows weekly starting salary and hours of work expected per week of persons working in that dimension.

TABLE XIV

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF MACHINERY PARTS CLERKS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$60	2
	78	1
	90	2
	100	6
	120	1
More than 40	$55	1
	67	1
	75	3
	80	1
	85	3
	90	6
	92	1
	95	1
	98	1
	100	15
	105	1
	110	2
	120	3
	125	3

Average starting weekly salary for machinery parts clerks working forty hours was $92 per week; more than forty hours--$96 per week. Salaries ranged from $55 to $125 and averaged $95 for all respondents.

Fifty employers concurred that special training was essential and that at least three years experience desirable for persons

entering machinery parts clerk occupations.

There are currently seventy-six workers employed in this capacity with fifty-one openings projected within the next five years.

Machinery equipment salesman. In tabulating salaries and work hours per week as reported in Table XV, no consideration was given to the fact that many machinery employers compensate salary with commissions in machinery equipment salesmen occupations.

TABLE XV

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF MACHINERY EQUIPMENT SALESMEN AS REPORTED BY NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	3
	100	3
	115	1
	130	2
	135	1
	150	1
More than 40	$75	2
	87	1
	90	1
	100	17
	110	1
	115	1
	125	6
	129	1
	135	2
	140	1
	150	9

Data in Table XV reported salary ranges from $75 to $150 and averaging $117 for persons engaged in machinery equipment salesmen work. Employees working forty hours average $97 per week; those working more than forty average $116 per week.

Employers indicated there will be fifty openings in New Mexico and West Texas for machinery equipment salesmen. Fifty-five people are now employed in this capacity.

Farm machinery service center foreman. Employees engaged as farm machinery service center foremen schedule jobs for other mechanics, check job tickets, keep records of parts used and organize the work of several mechanics and mechanics' helpers. Often a person designated as head mechanic will also serve as machinery service center foreman.

Table XVI reflects the starting weekly salary and number of work hours per week required of farm machinery service center foreman.

TABLE XVI

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF FARM MACHINERY SERVICE CENTER FOREMAN AS REPORTED BY NINETY-EIGHT MACHINERY ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	1
	100	3
	110	1

TABLE XVI (continued)

Number of work hours required per week	Salary per week	Number of responses
40	120	1
	125	3
More than 40	$90	1
	100	4
	105	1
	120	1
	125	10
	130	2
	140	1
	150	4
	160	1
	175	1

Employees working as farm machinery service center foremen average $110 for a forty hour work week and $123 if working more than forty hours.

In five years, twenty-five machinery service center foremen will be needed in New Mexico and West Texas. Thirty-two employees are now serving in this category.

All employers agreed that special training is needed and that up to five years experience is necessary for farm machinery service center foremen positions.

Mechanic's helper. Salaries and work hours per week required of mechanic's helpers are indicated in Table XVII.

TABLE XVII

WEEKLY STARTING SALARIES AND WORK HOURS PER WEEK REQUIRED OF MECHANIC'S HELPERS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$60	1
	65	1
	70	1
	75	1
More than 40	$50	1
	60	1
	62	1
	65	1
	70	2
	75	5
	78	1
	80	4
	85	6
	110	1

Mechanic's helpers working forty hours average $68 per week; those working more than forty hours--$77 per week. Salaries from all respondents ranged from $50 to $110 and averaged $75 per week for persons employed as mechanic's helpers.

It was noted in the survey that eighteen employers suggested special training was necessary, while twelve employers said that special training for this position was not needed.

Respondents concurred that a person could enter the machinery industry as a mechanic's helper without previous working experience

in the field.

Responses indicated thirty-four mechanic's helpers will be needed within five years; and at present, thirty-seven are working in this occupation level.

Diesel mechanic. Table XVIII indicates the starting weekly salary level and work hours per week expected of employees serving as diesel mechanics.

TABLE XVIII

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF DIESEL MECHANICS AS INDICATED BY NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	1
	90	1
	100	3
	108	1
	115	1
	120	1
More than 40	$75	1
	87	1
	90	1
	100	5
	110	1
	115	2
	120	3
	125	2
	130	1
	150	2

Average weekly starting salary for diesel mechanics working forty hours was $102 per week; for those working more than forty hours--$113 per week. Salaries in Table XVIII ranged from $75 to $150 and averaged $109 for diesel mechanics.

Thirty-five persons are presently working as diesel mechanics in New Mexico and West Texas, forty more will be needed within five years.

All respondents agreed that special training was necessary for diesel mechanics and that at least two years experience was desirable for persons seeking this position.

Assemblyman. Larger, specialized machinery businesses employ assemblymen who are responsible for constructing disassembled agricultural machines and equipment. Employers with a small business and fewer workers mentioned it desirable for their employees to have knowledge and competency in machinery and equipment assembly skills.

Table XIX reports the weekly starting salary and work hours per week required of assemblymen.

TABLE XIX

WEEKLY STARTING SALARY AND WORK HOURS PER WEEK REQUIRED OF ASSEMBLYMEN BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0

TABLE XIX (continued)

Number of work hours required per week	Salary per week	Number of responses
40	$60	1
	75	1
	80	2
More than 40	$50	2
	65	2
	75	2
	80	5
	85	1
	90	1
	95	1
	100	3
	105	1
	130	1

Respondents indicated an average salary for assemblymen working forty hours to be $74 per week, and those working more than forty hours to be $84 per week.

Data in Table XIX reports salary ranges from $50 to $130 and averaging $82 for assemblymen.

Sixteen employers mentioned that special training was necessary, and nine employers said that special training was not needed for entry into machinery and equipment assembly work.

Respondents pointed out that thirty-four persons were working as assemblymen in New Mexico and West Texas and that thirty-four more employees will be needed in this capacity within the next five years.

Machinery parts salesman. In tabulating the starting weekly salary and work hours per week required of machinery parts salesmen

as reported in Table XX, no consideration was given to the fact that employers often pay commissions to salesmen in addition to the salary.

TABLE XX

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF MACHINERY PARTS SALESMEN BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	1
More than 40	$55	1
	80	1
	90	1
	100	10
	110	1
	120	2
	125	4
	140	1
	150	2

Machinery parts salesmen working more than forty hours range in salary from $55 to $150 per week and average $110 per week.

Twenty-two respondents indicated that special training was needed for positions as machinery parts salesmen. Three employers said that special training was not necessary. Employers agreed, however, that up to eight years experience was desirable for this occupation.

Thirty workers are now employed as machinery parts salesmen in

New Mexico and West Texas. Twenty-one machinery parts salesmen will be needed in the industry within five years.

Machinery fieldman. Persons employed as machinery fieldmen represent machinery dealers at fairs and shows where farm machinery and equipment is on display. They also serve as salesmen and demonstrators and assist the dealer in checking on complaints reported by customers.

Data in Table XXI reports the weekly starting salary and work hours per week required of machinery fieldmen.

TABLE XXI

STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF MACHINERY FIELDMEN BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Number of work hours required per week	Salary per week	Number of responses
Less than 40		0
40	$80	1
More than 40	$80	2
	100	4
	125	3

Employees working as machinery fieldmen have a salary ranging from $80 to $125 and averaging $102 per week.

Respondents concurred the need for special training and said that at least three years experience was desirable for employment as a machinery fieldman.

Currently, ten employees are working as machinery fieldmen; eleven more will be needed within the next five years in New Mexico and West Texas.

Table XXII compares the weekly starting salary and work hours per week required of persons employed as tire service repairmen, small gas engine mechanics, arc welders and acetylene welders.

TABLE XXII

A COMPARISON OF STARTING WEEKLY SALARY AND WORK HOURS PER WEEK REQUIRED OF PERSONS EMPLOYED IN VARIOUS MACHINERY OCCUPATIONS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Occupation	Hours per week required	Starting salary per week	Number of responses
TIRE SERVICE REPAIRMAN	More than 40	$80	1
		100	2
		110	1
ARC WELDER	40	$90	1
		110	1
	More than 40	$92	1
		100	2
ACETYLENE WELDER	40	$90	1
	More than 40	$100	1
SMALL GAS ENGINE MECHANIC	More than 40	$75	1
		97	1

Responses from the thirteen employers indicated that twenty employees are now working in the four machinery enterprises listed in Table XXII. The data further indicated that sixteen jobs will be

available in the four machinery occupations within the next five years.

Replies of all respondents regarding the number of anticipated employees needed in the next five years and the number of workers now employed in machinery enterprises are reported in Table XXIII. The average starting weekly salary for thirteen machinery occupations used in the survey is also included in Table XXIII.

TABLE XXIII

A COMPARISON OF ANTICIPATED NUMBER OF EMPLOYEES NEEDED WITHIN FIVE YEARS, THE NUMBER OF WORKERS PRESENTLY EMPLOYED, AND THE AVERAGE STARTING WEEKLY SALARY FOR MACHINERY OCCUPATIONS BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Machinery occupation	New workers needed within five years	Employees now working	Average salary
Tractor & machine mechanic	166	238	$101
Machinery parts clerk	51	76	95
Machinery equipment salesman	50	55	117
Diesel mechanic	40	35	109
Mechanic's helper	34	37	75
Assemblyman	34	34	82
Machinery service center foreman	25	32	123
Machinery parts salesman	21	30	108
Machinery fieldman	11	6	101

TABLE XXIII (continued)

Machinery occupation	New workers needed within five years	Employees now working	Average salary
Arc welder	7	8	$98
Tire service repairman	5	7	97
Small gas engine mechanic	3	2	86
Acetylene welder	1	3	95

Responses in Table XXIII indicated 536 employees presently working in thirteen machinery occupations in New Mexico and West Texas with 448 additional personnel needed for these occupations within the next five years.

Data in Table XXIV reported the replies of ninety-eight employers regarding whether they would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate for the same job. Responses are based on thirteen occupational titles in machinery fields.

TABLE XXIV

AN INDICATION OF MACHINERY EMPLOYERS ATTITUDES IN TERMS OF HIRING A GRADUATE OF A TWO-YEAR PROGRAM AT A HIGHER SALARY THAN THEY WOULD HIRE A HIGH SCHOOL GRADUATE, BASED ON REPORTS FROM NINETY-EIGHT ESTABLISHMENTS IN NEW MEXICO AND WEST TEXAS, 1967

Machinery occupation	Respondents preference for hiring graduates of a two-year program at a higher salary than they would hire a high school graduate	
	Would	Would not
Tractor & machine mechanic	74	7
Machinery parts clerk	47	3
Machinery equipment salesman	46	4
Machinery service center foreman	30	4
Mechanic's helper	27	3
Diesel mechanic	27	0
Machinery parts salesman	21	3
Assemblyman	18	8
Machinery fieldman	10	0
Arc welder	4	0
Tire service repairman	3	1
Small gas engine mechanic	2	0
Acetylene welder	1	0

Data from 343 potential machinery employment positions in Table XXIV indicated that employers would hire a graduate of a

two-year program at a higher salary than they would hire a high school graduate in 310 cases or for 90 per cent of the positions available; whereas, for 10 per cent of the potential employment openings, employers would show no preference.

Farm machinery employers anticipated no need for tire service foreman occupations in New Mexico and West Texas within the next five years.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter IV contains a summary of the study, the conclusions drawn based upon findings and recommendations made in view of the findings. Suggestions for additional research in off-farm occupations at the technician level of preparation are also included.

Summary

The present investigation concerned itself with identifying occupational employment needs in horticulture and machinery enterprises in New Mexico and West Texas. The study was further concerned with hours of work per week required, weekly starting salary and amount of training preferred in these occupations.

The findings of this study were based on information obtained from 79 horticultural businesses and 98 machinery employers.

Specific information was secured by the mailed questionnaire method. Each employer was asked to respond to questions regarding work hours per week, starting weekly salary, necessity for special training, years of experience desired, employees presently working, and openings expected within five years for occupations in the field. Respondents were also asked to indicate whether they would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate should an employment opening exist.

The following summary of findings is limited to the 79 horticultural businesses and 98 machinery employers contacted:

Horticulture

1. The greatest need for horticultural employees exists in retail nursery activities and golfcourse maintenance and operation. Fewer jobs are available through state or city park systems or through wholesale nursery industries.
2. Many nursery units are small family-owned and operated enterprises not needing additional employees beyond family members.
3. Starting salaries paid to horticultural workers ranged from $40 to $150 per week and for all occupations averaged $86 per week.
4. Currently, there are 112 persons working in nineteen horticultural occupations, 95 more workers will be needed in the industry within the next five years.
5. Employers would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate in 93 per cent of the positions available; whereas, for 7 per cent of the potential employment openings, employers would show no preference to a graduate of a two-year program.

Agricultural Mechanics

1. The most critical need for machinery employees is in the area of tractor, diesel and machine mechanics, machinery

parts clerks, and farm machinery equipment salesmen positions.

2. Starting salaries for farm machinery occupations ranged from $50 to $175 per week, and averaged $100 per week for all positions.
3. At the present time, 536 employees are working in thirteen machinery occupations, 448 additional personnel will be needed in five years.
4. Employers would hire a graduate of a two-year program at a higher salary than they would hire a high school graduate for 90 per cent of the positions available; whereas, for 10 per cent of the potential openings, employers would show no preference to a graduate of a two-year program.

Conclusions

The conclusions listed here follow in light of the reported findings.

1. Two-year post high school training at the Agricultural Institute would be valuable for students who are planning to enter horticulture and machinery occupations at the technical level.
2. The possession of certain skills and knowledge has value to individuals in obtaining initial employment, for upgrading in their present job, or for advancement in technical off-farm agricultural occupations. Formal programs to provide these skills and knowledges would

appear to have value to both employers and employees concerned.

3. Cooperation between Agricultural Institute training in horticulture and machinery and student on-the-job experience programs might be expanded to the benefit of both.

Recommendations

The following recommendations are offered to implement the findings of the present study for New Mexico and West Texas.

1. Since job opportunities exist and special training needs have been indicated, education programs in machinery and horticulture occupations should be expanded at the Agricultural Institute to provide technicians for these fields.
2. Curricula at the two-year Agricultural Institute should focus on preparing students for positions as diesel, tractor and machine mechanics, machinery parts clerks, and machinery equipment salesmen in the machinery industry; and, for florist designers, nursery retail salesmen and golfcourse greenskeepers positions in the horticultural industry.
3. Since high school training was found to be insufficient for entry into horticulture and machinery fields, more emphasis on terminal, occupation-centered education is justified in the post high school, two-year Agricultural Institute program.

4. More research studies should be conducted in the area of off-farm agricultural occupation training at the Agricultural Institute to determine what additional technical programs should be used to prepare individuals who plan to enter off-farm technical agriculture occupations.

BIBLIOGRAPHY

Books

Smith, Harold T. Education and Training for the World of Work. Michigan: The W. E. Upjohn Institute, 1963. 14 pp.

Pamphlets and Bulletins

Agan, R. J. A Study of Non-Farm Agricultural Occupations in Kansas. Cooperative Study--Kansas State Board for Vocational Education and the School of Education. Manhattan, Kansas: Kansas State University, 1963. 24 pp.

Arnold, Walter M. "The Team Approach in Vocational Education," A Design for the Future. Report of a National Seminar on Agricultural Education. Bulletin of the National Center for Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1963. 235 pp.

Bailey, J. K. Non-Farm Agricultural Employment in West Virginia with Implications for Vocational--Education Programs. Report from the Division of Vocational, Technical, and Adult Education. Charleston, West Virginia: University of West Virginia, 1965. 34 pp.

Baker, R. A. A Study of Employment Opportunities in Off-Farm Agricultural Occupations in Alabama. Joint Study by the Agricultural Education Service, Alabama State Department of Education, Montogomery, and the Department of Vocational, Technical, and Practical Art Education, School of Education. Auburn, Alabama: Auburn University, 1965. 24 pp.

Barwick, R. P. Identification of Off-Farm Agricultural Occupations. Agricultural Education Publication Number 3. Newark, Delaware: The University of Delaware, 1965. 13 pp.

Blackman, J. H. and C. G. Dawson. Need for Training for Non-Farming Agricultural Occupations. Report by the Vocational Division. Raleigh: North Carolina Department of Public Instruction, 1961. 9 pp.

Brinkley, Harold. Pilot Programs in Agricultural Occupations. Bulletin of Vocational Education, College of Education. Lexington, Kentucky: University of Kentucky, 1967. 50 pp.

Brush, Ray. "Providing Planned Supervised Occupational Experiences for Technical Occupations," A Training Institute for Teachers of Technical Programs in Agriculture. Cobleskill, New York: State University of New York, 1966. 79 pp.

Bundy, C. E. and D. L. Blake. Competencies in Agriculture Needed by Males Employed in Off-Farm Agricultural Occupations. Cooperative Study--Department of Education, and Iowa Agriculture and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, and the Vocational Agriculture Section, State Department of Public Instruction, Des Moines, 1965. 62 pp.

Clary, Joe R. "Guidelines for the Development of Training Programs for Agricultural Technicians," Preparing Agricultural Technicians. Report of a National Seminar on Agricultural Education. Bulletin of the National Center for Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1964. 188 pp.

Foster, Paul J. A Study of Agricultural Occupations Other Than Farming and Ranching in Colorado. A Preliminary Report. Denver, Colorado: State Board for Vocational Education, 1965. 58 pp.

Freier, E. E. The Minnesota Agricultural Off-Farm Occupational Opportunities and Training Needs. Mankato, Minnesota: The Mankato Area Vocational-Technical School, 1965. 35 pp.

Hamlin, H. M. "Improving Post-High School Education in Agriculture," A Design for the Future. Report of a National Seminar on Agricultural Education. Bulletin of the National Center for Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1963. 235 pp.

Hunsicker, H. N. "Opportunities Unlimited," A Training Institute for Teachers of Technical Programs in Agriculture. Cobleskill, New York: State University of New York, 1966. 76 pp.

Kanetzke, L. R. "The Importance of Technical Training for the Farm Equipment Business," A Training Institute for Teachers of Technical Programs in Agriculture. Cobleskill, New York: State University of New York, 1966. 76 pp.

Langdon, C. L. A Survey of Agricultural Occupations in Michigan. A Report by the Vocational Agriculture Service. Lansing, Michigan: Department of Public Instruction, 1965. 73 pp.

Mondart, C. L. and C. M. Curtis. Occupational Opportunities and Training Needs for NonFarm Agricultural Jobs in the Metropolitan Areas of Louisana. Vocational Agriculture Education Bulletin Number 3. School of Vocational Education, College of Education. Baton Rouge, Louisana: Louisana State University, 1965. 89 pp.

Phipps, Lloyd J. "Determining Needs for Agricultural Technicians," Preparing Agricultural Technicians. Report of a National Seminar on Agricultural Education. Bulletin of the National Center on Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1964. 188 pp.

Schank, D. R. A Study of the Off-Farm Agriculture Occupations of Utah's Salt Lake and South Davis Counties to Determine Educational Needs. Report from the Department of Agricultural Education. Logan, Utah: Utah State University, 1964. 81 pp.

Shoemaker, Byrl R. "What is a Technician," Preparing Agricultural Technicians. Report of a National Seminar on Agricultural Education. Bulletin of the National Center for Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1964. 188 pp.

Stevens, Glenn Z. "Promising Research Directions in Off-Farm Agricultural Occupations," Program Development and Research. Report of a National Seminar on Agricultural Education. Bulletin of the National Center for Advanced Study and Research in Agricultural Education. Columbus: The Ohio State University, 1965. 176 pp.

Sutherland S. S. and O. E. Thompson. The Training Required by Workers in Agricultural Business and Industry in California. Sacramento, California: California State Department of Education, 1957. 40 pp.

Government Publications

United States Office of Education. A Suggested Two-Year Post High School Curriculum and Course Outline. Report from the Center for Research and Leadership Development in Vocational and Technical Education. Division of Adult and Vocational Research. Washington, D. C.: U. S. Office of Education, 1965. 134 pp.

Dissertations

Bingham, W. "Agricultural Occupations Other Than Farming in Selected Kentucky Counties, With Implications for Vocational Education." Unpublished Doctor of Philosophy dissertation, University of Kentucky, Lexington, 1964.

Halterman, Jerry J. "Determination of Educational Needs of Agricultural Engineering Technicians in Ohio." Unpublished Doctor of Philosophy dissertation, The Ohio State University, Columbus, 1964.

Kahler, Alan A. "Competencies in Agriculture Needed by Males Employed in Retail Farm Machinery Distribution." Unpublished Master's thesis, Iowa State University, Ames, 1964.

Wagley, Leon A. "Educational Requirements for Off-Farm Agricultural Occupations in Yuma County, Arizona." Unpublished Doctor of Education dissertation, University of Arizona, Tucson, 1964.

APPENDIX A

Name_____ Address_____

INSTRUCTIONS:

Choose the Job Title(s) below that fit the employees in your business. List the number of the Job Title(s) on the lines (I, II, III, etc.). Fill in the appropriate information in columns A, B, C, D, etc. See example below.

****

1. State Park Foreman
2. City Park Landscape Foreman
3. City Park Greenhouse Foreman
4. City Park Foreman
5. City Park Grower Apprentice
6. City Park Machinery Operator
7. Florist Manager
8. Florist Designer
9. Nursery Retail Manager
10. Nursery Retail Salesman
11. Nursery Wholesale Manager
12. Nursery Wholesale Section Foreman
13. Nursery Wholesale Propagator
14. Nursery Wholesale Budder & Grafter
15. Nursery Transportation Foreman
16. Nursery Wholesale Salesman
17. Nursery Wholesale Order Filler
18. Golfcourse Greenskeeper
19. Golfcourse Pest Control Foreman
20. Golfcourse Section Foreman
21. Greenhouse Grower
22. Land Contracting Estimator
23. Land Contracting Foreman
24. Arborculture Dendrician
25. Speciality Grower
26. Seed Grower
27. Sod Cutter & Sod Layer
28. Ornamental Plant Broker
29. Landscape Gardener

****

	A Hours of work			B Salary	C Education and/or Experience needed for advancement		D Number of job openings expected within the next five years	E Number of employees now working in this capacity	F If an opening should exist, would you hire a grad. of a 2-year program at a higher salary than a high sch. graduate	
	Less than 40 per week	40 hrs per wk	More than 40 per week	Per week	Special training needed	Number yrs experience needed			Yes	No
EX 7		✓		$82	Yes	2	1	2	✓	
I										
II										
III										
IV										

APPENDIX B

Name_____ Address_____

INSTRUCTIONS:

Choose the Job Title(s) below that fit the employees in your business. List the number of the Job Title(s) on the lines (I, II, III, etc.). Fill in the appropriate information in columns A, B, C, D, etc. See example below.

****

1. Tractor & Machine Mechanic
2. Machinery Parts Clerk
3. Machinery Parts Salesman
4. Machinery Service Center Foreman or Head Mechanic
5. Machinery Equipment Salesman
6. Machinery Fieldman
7. Diesel Mechanic
8. Mechanic's Helper
9. Assemblyman
10. Tire Service Repairman
11. Tire Service Foreman
12. Small Gas Engine Mechanic
13. Arc Welder
14. Acetylene Welder

****

	A Hours of work			B Salary	C Education and/or Experience Needed for advancement		D Number of job openings expected within the next five years	E Number of employees now working in this capacity	F If an opening should exist, would you hire a grad. of a 2-year program at a higher salary than a high sch. graduate	
	Less than 40 per week	40 per wk	More than 40 per week	Per week	Special training needed	Number yrs experience needed			Yes	No
EX 8			✓	$90	No	0	4	2	✓	
I										
II										
III										
IV										
V										
VI										

APPENDIX C

NEW MEXICO STATE UNIVERSITY
Department of Agricultural & Extension Education

October 12, 1966

Dear Sir:

Attached is a questionnaire which we are using to determine:

(1) The number and types of job opportunities available for students graduating from the Agricultural Institute, a two-year technical program in Mechanics and Horticulture.

(2) What specific areas of instruction should be emphasized in the Agricultural Institute.

We are asking your cooperation with this research effort by completing the appropriate items in the questionnaire and returning it to us before October 24, 1966.

Your response is vital to the success of the study and important in the future continuation of the Agricultural Institute.

Sincerely,

Ramsey M. Groves
Director

RMG/gl

Encl.

APPENDIX D

NEW MEXICO STATE UNIVERSITY
Department of Agricultural & Extension Education

November 3, 1966

Dear Sir:

Have you found it more difficult with each passing year to obtain qualified help in your business? Does it seem to you that the vitally important PRACTICAL EDUCATION for the PRACTICAL MASSES has been forgotten? Well, it hasn't!

New Mexico is among the states giving early consideration to the need for vocationally trained individuals, and New Mexico State University is beginning its third two-year program, this one in agriculture, to meet that need.

You might be surprised how mutually beneficial it will prove to your "growing pains" and ours if you can take a few minutes out of your busy schedule now and then to acquaint us with your needs. The enclosed questionnaire, thoughtfully filled out by you, can help us direct our efforts.

A self-addressed envelope is enclosed, along with our thanks.

Sincerely,

Ramsey M. Groves
Director

RMG/gl

Encl. - 2

APPENDIX E

TITLE DESCRIPTIONS ** ORNAMENTAL HORTICULTURE

1. State Park Foreman - Directs the care and maintenance of ornamental planting areas, as well as natural woodlands and forest.

2. City Park Landscape Foreman - Sets up locations and directs the maintenance of planting areas, formal flower and lawn areas.

3. City Park Greenhouse Foreman - Determines kinds and amount of plants to be grown. Supervises activities of workers engaged in greenhouse operations.

4. City Park Foreman - Plants, prunes, fertilizes lawns, trees, shrubs and hedges. Controls insects, diseases, weeds and utilizes proper care of the soil.

5. City Park Grower Apprentice - Assists the park grower. Also, weeds flower beds, plants, prunes, rakes and disposes of leaves and other refuse.

6. City Park Machinery Operator - Mows grass and trims the edges of walks and driveways, operates spray equipment.

7. Florist Manager - Buys flowers from wholesale sources, grades them and properly stores and cares for them. Responsible for the operation of the floral business.

8. Florist Designer - Designs and arranges floral pieces. Makes corsages and creates floral effects.

9. Nursery Retail Manager - Manages nursery to grow trees, shrubs, and ornamentals. Hires and supervises nursery workers engaged in marketing retail nursery products.

10. Nursery Retail Salesman - Secures wholesale ornamental plants and supplies and moves them into selling areas. Arranges plants for display purposes, and contacts prospective buyers.

11. Nursery Wholesale Manager - Organizes nursery to grow trees, shrubs and ornamentals. Hires and supervises workers engaged in marketing wholesale nursery products.

12. Nursery Wholesale Section Foreman - Determines work priority and assigns workers to specific tasks. Usually responsible for one area of wholesale nursery operation.

13. Nursery Wholesale Propagator - Prepares seedbeds, plants seedlings, weeds, cultivates, waters, prunes and sprays.

14. Nursery Wholesale Budder & Grafter - Grafts or buds trees, shrubs or ornamentals of different varieties.

15. Nursery Wholesale Transportation Foreman - Grades and packs ornamentals for shipment. Directs activities regarding transportation facilities.

16. Nursery Wholesale Salesman - Sells nursery products to retail nursery establishments or individual customers. Estimates prices, prepares contracts and contacts prospective buyers.

17. Nursery Wholesale Order Filler - Maintains equipment, hauls and spreads topsoil, fertilizer, peat moss to condition land. Plants, sows seed, digs holes, and builds wood forms.

18. Golfcourse Greenskeeper - Cares for turf on greens and fairways. Installs and uses irrigation and drainage equipment, cleans and maintains sand traps, changes location of cups and aerates the soil.

19. Golfcourse Pest Control Foreman - Inspects turf and ornamental plants for pest damage. Estimates number of man hours and materials required to correct situation and directs treatment.

20. Golfcourse Section Foreman - Determines work priority and assigns workers to specific tasks.

21. Greenhouse Grower - Grows plants in an artificially controlled greenhouse. Propagates trees and ornamentals from seeds or cuttings.

22. Land Contracting Estimator - Uses compiled and analyzed data on site conditions, such as geographic location, soil, vegetation and drainage. Estimates cost of developing area for park of recreational facility.

23. Land Contracting Foreman - Directs the construction and development of sites for parks and recreational facilities.

24. Arborculture Dendrician - Prunes trees that interfere with wires or views along roads. Trims storm-damaged trees and removes dead and diseased trees.

25. Speciality Grower - Produces cut flowers, growing plants for sale or starts plants for outdoor nursery beds.

26. Seed Grower - Plants, cultivates and harvests pure varieties of seed for sale to commercial seed houses or individual customers.

27. Sod Cutter & Sod Layer - Transplants sod by cutting it into squares, rolls it into bundles and then lays it out onto freshly cleared ground.

28. Ornamental Plant Broker - Purchases nursery products from growers for resale to wholesale or retail nursery establishments.

29. Landscape Gardener - Develops and maintains basic plantings around private homes, public buildings, and industrial plants. Works from plan of architect.

APPENDIX F

TITLE DESCRIPTIONS ** FARM MECHANICS

1. Tractor and Machine Mechanic - Skilled general mechanic, repairs and overhauls engines, power transmissions, hydraulic systems and electrical systems. Adjusts and repairs implements.

2. Machinery Parts Clerk - Sells supplies and parts both over counter and over phone, orders parts and keeps store inventory, receives supplies and stocks shelves and bins, makes up statements, submits bills, keeps records and handles cash, checks, and credit.

3. Machinery Parts Salesman - Calls on prospective buyers, completes sales and collects on accounts. May work within definite territory and may handle only one line of equipment.

4. Farm Machinery Service Center Foreman or Head Mechanic - Schedules jobs, checks job tickets, keeps records of parts used, organizes work of several mechanics and mechanics' helpers.

5. Machinery Farm Equipment Salesman - Sells new and used machines, visits prospective buyers, closes sales, gets contracts signed, writes up terms and collects bills. Checks on complaints, supervises installation of new equipment.

6. Machinery Fieldman or Serviceman - Combination trouble-shooter, salesman and demonstrator. Helps dealers operate a good business. Checks on complaints. Represents dealers at fairs and shows where farm machinery is on display.

7. Diesel Mechanic - Repairs and maintains diesel engines to power large farm machines. Diagnoses trouble, reconditions and replaces parts.

8. Mechanic's Helper - Aids mechanic, unpacks and assembles new machinery, steam cleans and disassembles machinery to be repaired, washes parts, paints machinery and cleans up shop.

9. Assemblyman - Assembles agricultural machines and equipment shipped knocked down.

10. Tire Service Repairman - Changes, loads with liquid or dry materials, inspects, remounts, repairs, and recaps all types of tires on trucks, tractors and machines. Inspects and vulcanizes casings and balances mounted tires.

11. Tire Service Foreman - Supervises and coordinates workers engaged in servicing and repairing automobile, truck and tractor tires and tubes. Examines damages, feasibility of repair, and assigns workers to task.

12. Small Gas Engine Mechanic - Repairs low-horsepower gasoline engines. Locates trouble, dismantles, replaces or repairs defective parts.

13. Arc Welder - Repairs and rebuilds worn and broken parts. Heats and bends metals into replacement parts, hard surfaces plow and cultivator points.

14. Acetylene Welder - Cuts, brazes, and welds, repairs and rebuilds worn and broken parts.

END

DEPT. OF HEALTH
EDUCATION AND
WELFARE

U.S. OFFICE OF
EDUCATION

ERIC

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